



PRETERM LABOR

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Preterm Labor (PTL)

- ACOG defines Preterm Labor as regular contractions with cervical change before 37 weeks' gestation





PTL: Incidence

- 10-12% of all pregnancies
- PTL causes up to 50% of preterm deliveries
- Related to 80% of perinatal mortality
- Most common cause of hospitalization during pregnancy



Preterm Delivery (PTD)

- Despite medical advances PTL and preterm births rates not improving
- Medical advances = greater # complicated pregnancies and successful PTD
- Rate of U.S. preterm birth increasing
- 1995: 25th in world infant mortality
- Huge health care costs
- Continued ethical concerns



PTL: Risk Factors

- Maternal Factors:
 - Age (<18 and >40)
 - Race (nonwhite)
 - Poverty
 - Smoking
 - Drugs/EtOH
 - Prior preterm birth
- Maternal Factors:
 - Prior 2nd trimester abortion
 - Psychological stress
 - Poor nutrition
 - Low prepregnancy weight and gain



PTL: Risk Factors:

- Uterine:
 - Anatomic anomaly:
 - fibroids, placenta previa
 - Increased volume:
 - Multiple gestation, polyhydramnios
 - Trauma/abruption
 - Cervical incompetence



PTL: Risk Factors

- Infectious:
 - Chorioamnionitis
 - Bacterial Vaginosis
 - Chlamydia, gonorrhea, syphilis
 - Asymptomatic bacturia, UTI, Pyelonephritis
 - PPROM and ascending infection
 - Maternal infection e.g. appendicitis, pneumonia
 - +/- Trichomonas, Candida, *Ureaplasma urealyticum*, *Mycoplasma hominis*



Etiology PTL

Often multifactorial

Often no identified risk factors

Often idiopathic





PTL: Prevention and Early Detection

Education Programs: no evidence
of efficacy in low risk pregnancy

Intensive education in high-risk
groups has not decreased PTD
rates in US

Effective in Europe



Home Uterine Activity Monitoring (HUAM)

- Theory: patients may not recognize early uterine activity associated with PTD
- HUAM studied as method to predict preterm labor in high risk women
- Tocodynamometer readings, daily phone calls from RN/provider
- Mixed study results, insufficient data and cost have limited applicability



Risk Scoring Systems

Multiple scoring systems devised

No one better than another

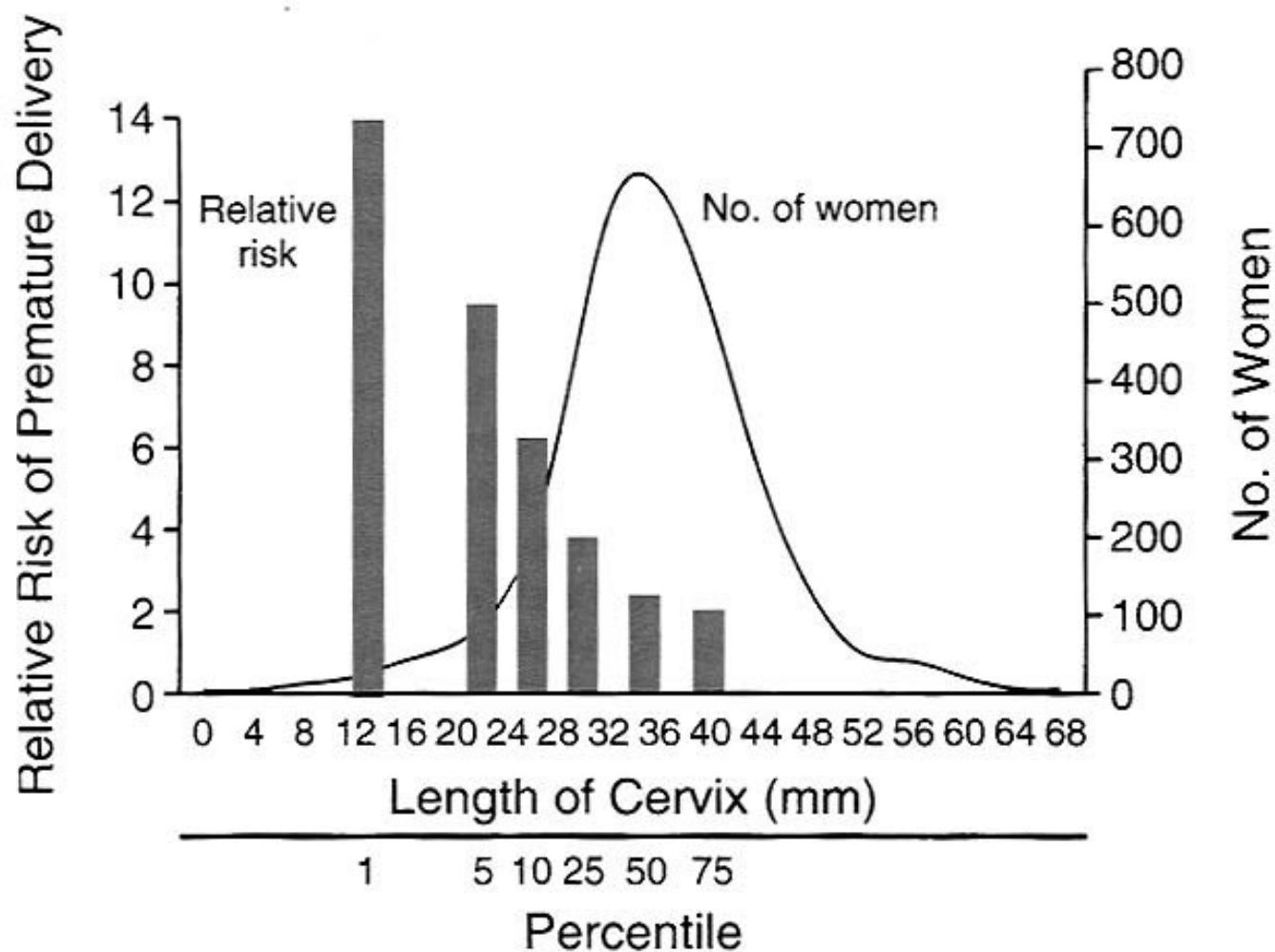
Unsuccessful in predicting PTL

May have role in predicting PTD



Cervical Ultrasonography

- Transvaginal cervical ultrasound (US)
 - Reliable length, dilation, effacement
 - More accurate than digital exam
 - Risk PTD ↑ w/ cervix length ↓
- Has value when done in patients w/ signs and symptoms of PTL





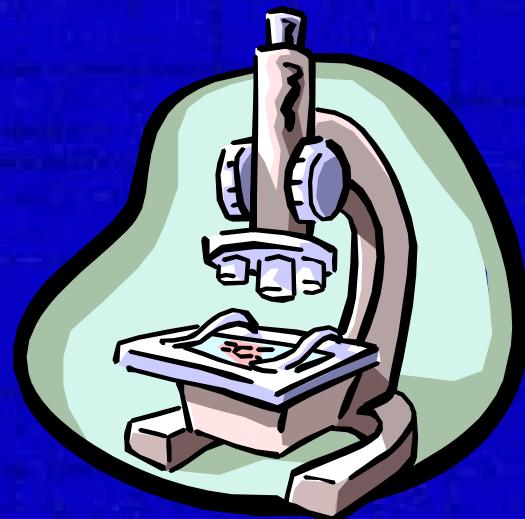
PTL and Bacterial Vaginosis

- Known association between PTL and BV
- Found in 10-25% pregnant women
- 50% asymptomatic
- Treatment of BV in high risk women shown to ↓ PTL
- Trials for screening and treatment have varying results



Biochemical Markers

- Multiple markers for PTL found:
 - Fetal fibronectin
 - Salivary Estriol
 - IL-6
 - Estradiol- 17β
 - Progesterone





Fetal Fibronectin

- Present throughout body, in blood
- Is a glue like substance that helps maintain placental attachment to the decidua
- Not detectable in vaginal secretions until term except in PTL
- Test high risk patients with swab sample of vaginal secretions



Fetal Fibronectin

- High specificity: after a negative test, 124 of 125 women will not deliver in next 14 days
- Positive result: 1 in 6 women will deliver in next 14 days
- May aid in early discharge vs. increased vigilance



PTL Surveillance and ACOG

- ACOG currently recommends (10/01):
 - No current data to support using salivary estriol, HUAM or BV screening to identify or prevent preterm birth
 - Ultrasound to determine cervical length, FFN testing or a combination of both may be useful in identifying women at high risk for PTL.
 - Usefulness lies in negative predictive value given lack PTD treatment options



Premature Rupture of Membranes (PROM)

- Rupture membranes at least 1 hour before onset labor
- Ave 8% pregnancies
- 20-40% before 37 weeks (PPROM)
- Same Risk Factors as PTL
 - Infection often the culprit



PTL/PPROM Evaluation

- History:
 - Ask about Risk Factors
 - Dating (preterm)
 - Onset symptoms (contractions, fluid leak, bleeding)
 - Other medical history





PTL/PROM Exam

- Maternal vitals: temp, BP, P, RR
- Maternal quick physical
- Fetal heart rate (FHR) pattern
- Contraction pattern
- Fetal size, presentation
- DO NOT DO DIGITAL EXAM IF ROM SUSPECTED OR WILL DO FFN TEST!



PTL/PPROM Exam

- Sterile Speculum Exam:
 - Look for pooling, trailing membranes
 - Nitrazine, ferning
- Cervix visualization
- FFN if available
- Wet prep, cultures (GBS)



PTL/PPROM studies

- Ultrasound:
 - cervix length, AFI, gestational age
- CBC, UA: r/o infection
- Preeclampsia labs as needed
- Amniocentesis for lung maturity as needed





PTL

- ACOG:
 - 4 contractions in 20 minutes or
 - 8 contractions in 60 minutes with
 - PROM
 - Progressive cervical change
 - Effacement greater than 80%
 - Cervical dilation greater than 1 cm



Initial Management

- Hydration, bed rest, pelvic rest
 - No evidence this is beneficial
- If infectious/specific etiology, treat
- Consider early transfer
 - Is delivery imminent?
 - Condition mother and fetus
 - Capabilities your/transfer center



PTL: Steroids

- Reduces RDS, IVH, infant mortality
- Only treatment shown to improve fetal survival in PTL
- Criteria:
 - fetus 24-34 weeks (32-34 w/ immature lungs)
 - Able to delay delivery 24-48 hrs
- Betamethasone 12 mg IM, 2 doses q 24 hr
- Dexamethasone 6 mg IM, 4 doses q 12 hr



PTL: Steroids

- Maternal Adverse Effects
 - Short term: glucose control, pulmonary edema, infection
 - Long term: no adverse effects
- Fetal Adverse Effects
 - No long term effects of single course
 - Multiple course associated w/ infection, abnormal development



PTL: Tocolysis

- Cannot prevent PTD
- Cannot suppress PTL long-term
- Can delay labor 24-48 hrs to allow steroid therapy to be beneficial
- Can delay delivery for transport to a tertiary care center



Tocolysis

- Criteria:
 - no contraindication to rx
 - no contraindication to prolonging pregnancy
 - Fetus healthy
 - PTL diagnosis clear
 - Cervix <4cm
 - 24-34 weeks



Tocolysis

- General Contraindications
 - Acute fetal distress
 - Chorioamnionitis
 - Severe preeclampsia/eclampsia
 - Fetal demise
 - Fetal maturity
 - Maternal hemodynamic instability



Tocolytic Agents

- Beta-mimetics
 - Ritodrine, terbutaline
- Magnesium Sulfate
- Indocin
- Nifedipine
- Antocin (oxytocin inhibitor)





Beta-mimetics

- Function:
 - Stimulate beta₂ receptors
 - Relaxes uterine muscle and lung muscle
- Ritodrine
 - IV dosing only (0.05-0.1 mg/min, ↑ every 10 minutes to max 0.35 mg/min and cessation of contractions)
 - ↓ rate by 0.05 mg/min every 30 min to lowest dose possible



Beta-mimetics

Terbutaline

- IV and multiple SC dosing effective in temporarily stopping contractions
- SC 0.25 mg q 1-4 hours
- IV 0.01 mg/min, ↑ 0.005 mg/min to maximum of 0.025 mg/min
- Reduces frequency PTD and low birth weight
- No benefit on RDS, mortality
- Oral dose not effective



Beta-mimetics

- Complications:
 - Tremor, nervousness, HA, N/V, anxiety, SOB
 - Hyperglycemia, hyperkinesias
 - Hypotension, pulmonary edema, arrhythmias, MI
 - Fetal tachycardia
- Contraindications:
 - Arrhythmias, cardiac disease
 - Poorly controlled hypertension
 - Poorly controlled diabetes, thyrotoxicosis



Magnesium Sulfate

- Widespread use
- Not effective in preventing PTD
- Effective in short term PTL, less side effects
- ? Works by calcium antagonist activity
- Load 4-6 gm IV, then 1-4 gm/hour
- Oral dose not effective



Magnesium Sulfate

- Side effects:
 - N/V, HA, warmth, sweating, flushing, palpitations, respiratory arrest (toxic levels)
 - Crosses placenta, no adverse fetal effects
- Exam:
 - Check DTRs, UOP, lung exam



Magnesium Sulfate

- Contraindications:
 - Myasthenia Gravis, renal failure, hypocalcemia
- Complications:
 - Pulmonary edema
 - Respiratory depression
 - Cardiac arrest
 - Tetany
 - Muscular paralysis
 - hypotension



Indocin

- Inhibits prostaglandins, cytokines that may trigger labor
- Can inhibit PTL for 48 hrs in <32 weeks
- Fetus: oligohydramnios, PDA constriction, IVH, NEC, anemia, renal failure
- 100mg rectal dose, repeat x1 in 1-2 hours if contractions persist
- 25mg orally q4-6 hours



Nifedipine

Inhibit contraction of smooth muscle

Some studies show efficacy similar to ritodrine

30 mg oral, then 20 mg q 4-8 hours, then 10 mg maintenance



Tocolysis

Only evidence showing acute tocolysis is beneficial for short term PTL management, and not for PTD

No evidence that maintenance tocolysis is beneficial fro PTL or PTD at this time in large studies



Antibiotics

- If have specific infection, treat
- If known GBS+, treat (no benefit PTL)
- Empiric antibiotics in PTL w/ intact membranes:
 - Conflicting results in delaying PTD
 - No short/long term benefits



PROM/PPROM

If >36 weeks, manage as PROM

If <32 weeks, manage as PPROM

If 32/36 weeks, weight
amniocentesis, weight, options



PPROM Management

- Delivery likely within 12-24 hours
 - Tertiary care center w/ NICU
 - Tocolysis, steroids
 - Antibiotics for GBS
 - Avoid digital exams
- Expectant management in delivery not imminent



PROM

- Expectant management vs. induction
 - 90% spontaneous labor <48 hrs
 - Induce if infection concern
 - Prostaglandins for unfavorable cervix
 - Oxytocin



ACOG Recommendations for PTL Management

No clear first-line (~~5/03~~)¹ tocolytic drugs for PTL.
Circumstances dictate treatment

Antibiotics do not appear to prolong gestation and should be reserved for GBS prophylaxis in imminent delivery

Neither maintenance tocolysis or repeated acute tocolysis improve perinatal outcome



ACOG Recommendations for PTL Management

Tocolytic drugs (Mayo 03) long pregnancy for 2-7 days, allowing for steroids administration to improve fetal lung maturity and maternal transport

Bed Rest, hydration and pelvic rest do not appear to improve PTD rates and should not be routinely recommended



Summary

- PTD rates are increasing
- +Modifiable risk factors
- Surveillance is predictive, not preventive
- Diagnosis= good history and exam
- Management does not prevent PTD
- Aggressive management can delay PTD, reduce infection and allow for lung maturity



Questions?